

CLAIMS

1. A device for resurfacing an ice rink or track including a drive system for moving the device over the surface of the ice rink or track, at least one heater device including a heat source and a conductive member for transferring heat from the heat source to the surface of the ice.
2. A device according to claim 1, including a computer controller.
3. A device according to claim 2, wherein the computer controller is arranged to control the depth to which the ice is melted.
4. A device according to claim 3, wherein the computer controller is arranged to control the amount of heat supplied to the or each heater device.
5. A device according to claim 4, wherein the computer controller is arranged to periodically interrupt the supply of heat to the or each heater device.
6. A device according to any one of claims 2 to 5, wherein the computer controller is arranged to control operation of the drive system.
7. A device according to any one of the preceding claims, wherein the conductive member has a substantially planar surface for contacting the ice.
8. A device according to any one of the preceding claims, wherein the conductive member includes means for reducing warping caused by differential heating of the body.
9. A device according to any one of the preceding claims, wherein the or each heater device includes at least one thermostatic device for monitoring the temperature of the conductive member.
10. A device according to any one of the preceding claims, including a plurality of heater devices.

11. A device according to any one of the preceding claims, wherein the vertical position of the or each heater device relative to the surface of the ice is adjustable.
12. A device according to any one of the preceding claims, wherein the heat source is arranged to heat the conductive member, in use, to a temperature within the range 20 to 100 degrees Celsius.
13. A device according to any one of the preceding claims, wherein the heat source comprises at least one electrically heatable element.
14. A device according to any one of claims 1 to 12, wherein the at least one heat source comprises a liquid.
15. A device according to any one of the preceding claims, wherein the or each heater device is mounted on an elongate structure and the drive system is arranged to move the elongate structure across the surface of the ice.
16. A device according to claim 15, wherein the elongate structure includes a fixed section 5 and at least one moveable section for adjusting the effective length of the elongate structure.
17. A device according to claim 16, including at least one sensor for detecting the position of the or each moveable section.
18. A device according to claim 16 or 17, including means for determining the alignment of the or each moveable section relative to the fixed section 5.
19. A device according to any one of the preceding claims, including a plurality of heater devices arranged to extend substantially across the width or length of the rink or track thereby forming a substantially continuous melting zone across the rink or track.
20. A device according to any one of the preceding claims, including means for adjusting the alignment of the resurfacing device as it moves across the ice.

21. A device according to claim 20, wherein the means for adjusting the alignment of the resurfacing device includes a plurality of sensors for detecting an arrangement of markers located below the ice.

22. A device according to claim 21, wherein the sensors for detecting the markers are arranged to measure the depth of ice.

23. A device according to claim 20, wherein the means for adjusting the alignment of the resurfacing device includes an arrangement of lasers, sensors and reflectors for determining whether the device is correctly aligned.

24. A device according to any one of the preceding claims, wherein the drive system includes a plurality of wheel modules having a plurality of wheels, a motor arranged to drive the wheels and an encoder for supplying operational information to the computer controller.

25. A device according to claim 24, wherein the wheels are arranged to grip the ice when rotated about their axes of rotation and are arranged to slide over the ice when driven in a direction substantially parallel to their axes of rotation.

26. A device according to claim 25, wherein the wheels include a plurality of grooves and teeth formed alternately in the curved surface of the wheel.

27. A device according to claim 26, wherein each tooth has a channel formed in its upper surface, thereby forming two ridges extending along the length of the tooth.

28. A device according to any one of the preceding claims, including at least one cell for supplying electrical power to at least one of the drive system, the computer controller, the lifting means and the sensors, and a cell charger connected to a mains supply for providing power to the cell.

29. A device according to any one of the preceding claims, including a winch system for adjusting the vertical position of the resurfacing device relative to the rink or track.

30. A device according to claim 29, including at least one flexible electrical connector attached to a mains supply for supplying electricity to at least one of the or each heater device and the cell charger, wherein the winch system is arranged to payout and retract the or each flexible electrical connector when the resurfacing device is lowered and raised respectively.

31. A device according to any one of claims 1 to 28, wherein the drive system includes at least one of a rack and pinion drive assembly and a screw drive assembly.

32. A device according to any one of the preceding claims, arranged to receive electrical power from electrical supply lines extending substantially along the length or width of the rink or track.

33. A device according to claim any one of the preceding claims, including water supply means for distributing water over the surface of the ice.

34. A device according to claim 33, wherein the or each heater device includes a network of channels and water outlets for depositing water onto the surface of the ice.

35. A device according to claim 34 when dependent on claim 11, wherein the means for adjusting the vertical position of the heater device is arranged to move the heater device to a position in which it impinges on a water supply line and thereby inhibits the supply of water to the heater device.

36. A device according to any one of the preceding claims, including means for removing melt water from the surface of the ice.

37. A device according to claim 36, including filter means for cleaning water removed from the ice.

38. A heater device for an ice rink resurfacing device including a heat source and a conductive member for transferring heat from the heat source to the surface of the ice.

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39. A heater device according to claim 38, wherein the heat source includes an electric heating element comprising a nichrome ribbon coated in an electric insulating material.

40. A heater device according to claim 38, wherein the heat source comprises a liquid.

41. A heater device according to any one of claims 38 to 40, wherein the heat source is arranged to heat the conductive member, in use, to a temperature within the range 20 to 100 degrees Celsius.

42. A heater device according to any one of claims 38 to 41, including means for reducing warping caused by differential heating of the body.

43. A heater device according to any one of claims 38 to 42, including water supply channels and outlets arranged for dispersing water on to the surface of the ice.

44. A wheel for an ice resurfacing device drive system arranged rotation about an axis and to grip the ice when driven about its axis and to slide over the ice when driven in a direction substantially parallel to the axis of rotation.

45. A wheel according to claim 44, including a plurality of grooves and teeth formed alternately in the curved surface of the wheel.

46. A device according to claim 45, wherein each tooth is profiled to include at least one ridge in its outer surface.

47. A winch system for raising and lowering an ice resurfacing device including at least one flexible connector for supporting the weight of the resurfacing device, first and second fixed pulley wheels, a moveable pulley wheel, and a drive system for moving the moveable pulley wheel, wherein the flexible connector is anchored at one end to a support and is wrapped around the pulley wheels, and the position of the ice resurfacing device is controlled by the drive system adjusting the position of the moveable pulley wheel.

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48. A winch system according to claim 47, including a plurality of flexible connector elements for supporting the weight of the resurfacing device.

49. A winch system according to claim 47 or 48, wherein including at least one electrical supply cable for supplying electrical power to the ice resurfacing device from a power source.

50. A winch system according to any one of claims 47 to 49 including at least one control cable for carrying electrical signals from a computer controller located on the ice resurfacing device to the drive system.

51. A winch system according to any one of claims 47 to 50, including at least one sensor for determining the position of the ice resurfacing device.